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**CLAIMS:**

What is claimed is:

*Sub A*

1. 1. A method for processing packets in a communications device, the method comprising the steps of:
  3. retrieving a packet from a packet buffer memory by a packet processing unit, wherein the packet processing unit is one of a plurality of packet processing units, wherein the packet buffer memory is one of a plurality of packet buffer memories, and wherein each packet buffer memory is connected with one of the plurality of packet processing units;
  8. determining a packet type for the packet;
  9. forwarding the packet to a Routing Table Processing Unit if the packet type is determined to be a routing information packet;
  11. retrieving forwarding information from a routing table if the packet is determined not to be a routing information packet, wherein the routing table is stored in a second shared memory connected to the plurality of packet processing units;
  14. updating the packet with the retrieved forwarding information; and
  15. forwarding the updated packet.
1. 2. A method for processing packets in a communications device, the method comprising the steps of:
  3. retrieving a packet from a first shared memory by a packet processing unit, wherein the packet processing unit is one of a plurality of packet processing units connected to the first shared memory;
  6. determining a packet type for the packet;
  7. forwarding the packet to a Routing Table Processing Unit if the packet type is determined to be a routing information packet;

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9        retrieving forwarding information from a routing table if the packet is  
10    determined not to be a routing information packet, wherein the routing table is stored  
11    in a second shared memory connected to the plurality of packet processing units;  
12        updating the packet with the retrieved forwarding information; and  
13        forwarding the updated packet.

1    3.        The method of claim 2 wherein a packet is forwarded by using a switch fabric  
2    connected to the plurality of packet processing units.

1    4.        The method of claim 4 wherein the routing table processing unit is connected  
2    to the switch fabric.

1    5.        The method of claim 2 further comprising:  
2            in response to receiving a routing information packet, locking a portion of the  
3    routing table by the routing table processing unit;  
4            updating the locked portion of the routing table with information from the  
5    routing table information packet; and  
6            unlocking the locked portion of the routing table.

1    6.        The method of claim 2 wherein the step of retrieving forwarding information  
2    from a routing table further comprises:  
3            searching the routing table;  
4            determining if a portion of the routing table is locked;  
5            waiting for the portion of the routing table to be unlocked; and  
6            retrieving the forwarding information when the portion of the routing table is  
7    unlocked.

1    7.        The method of claim 2 wherein the communications device interfaces with a  
2    wavelength division multiplexed (WDM) enabled network, and wherein the first

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3 shared memory stores packets transmitted on a single wavelength on the WDM-  
4 enabled network.

1 8. The method of claim 7 further comprising:  
2 providing differentiated service processing of packets based on a placement of  
3 a packet in one of a plurality of shared packet buffer memories, wherein the first  
4 shared memory is one of the plurality of shared packet buffer memories.

1 9. The method of claim 8 wherein the differentiated service processing  
2 comprises quality-of-service differentiation.

1 10. An apparatus for processing packets in a communications device, the  
2 apparatus comprising:

3 a plurality of packet processing units connected to a first shared memory and  
4 connected to a plurality of packet buffer memories, wherein the first shared memory  
5 stores a routing table, and wherein the plurality of packet buffer memories store  
6 packets; and

7 a routing table processing unit connected to the first shared memory

1 11. An apparatus for processing packets in a communications device, the  
2 apparatus comprising:

3 a plurality of packet processing units connected to a first shared memory and  
4 connected to a second shared memory, wherein the first shared memory stores  
5 packets, and wherein the second shared memory stores a routing table; and  
6 a routing table processing unit connected to the second shared memory.

1 12. The apparatus of claim 11 further comprising a switch fabric connected to the  
2 plurality of packet processing units.

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1 13. The apparatus of claim 12 wherein the routing table processing unit is  
2 connected to the switch fabric.

1 14. The apparatus of claim 11 wherein a packet processing unit further comprises:  
2 determining means for determining a packet type for a packet retrieved from  
3 the first shared memory;

4 a first forwarding means for forwarding the retrieved packet to the routing  
5 table processing unit if the packet type is determined to be a routing information  
6 packet;

7 retrieving means for retrieving forwarding information from a routing table if  
8 the retrieved packet is determined not to be a routing information packet;

9 updating means for updating the retrieved packet with the retrieved  
10 forwarding information; and

11 a second forwarding means for forwarding the updated packet.

1 15. The apparatus of claim 14 wherein the retrieving means further comprises:  
2 searching means for searching the routing table;  
3 determining means for determining if a portion of the routing table is locked;  
4 waiting means for waiting for the portion of the routing table to be unlocked  
5 before retrieving the forwarding information.

1 16. The apparatus of claim 11 wherein the routing table processing unit further  
2 comprises:

3 locking means for locking a portion of the routing table in response to  
4 receiving a routing information packet;

5 updating means for updating the locked portion of the routing table with  
6 information from the routing table information packet; and

7 unlocking means for unlocking the locked portion of the routing table.

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1 17. The apparatus of claim 11 wherein the communications device interfaces with  
2 a wavelength division multiplexed (WDM) enabled network, and wherein the first  
3 shared memory stores packets transmitted on a single wavelength on the WDM-  
4 enabled network.

1 18. The apparatus of claim 11 further comprising:  
2 a plurality of shared packet buffer memories, wherein the first shared memory  
3 is one of the plurality of shared packet buffer memories; and  
4 differentiated processing means for providing differentiated service  
5 processing of packets based on a placement of a packet in one of the plurality of  
6 shared packet buffer memories.

1 19. A computer program product in a computer readable medium for processing  
2 packets in a communication system, the computer program product comprising:  
3 first instructions for retrieving a packet from a first shared memory by a  
4 packet processing unit, wherein the packet processing unit is one of a plurality of  
5 packet processing units connected to the first shared memory;  
6 second instructions for determining a packet type for the packet;  
7 third instructions for forwarding the packet to a routing table processing unit if  
8 the packet type is determined to be a routing information packet;  
9 fourth instructions for retrieving forwarding information from a routing table  
10 if the packet is determined not to be a routing information packet, wherein the routing  
11 table is stored in a second shared memory connected to the plurality of packet  
12 processing units;  
13 fifth instructions for updating the packet with the retrieved forwarding  
14 information; and  
15 sixth instructions for forwarding the updated packet.

1 20. The computer program product of claim 19 further comprising:

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2           seventh instructions for locking a portion of the routing table by the routing  
3   table processing unit in response to receiving a routing information packet;  
4           eighth instructions for updating the locked portion of the routing table with  
5   information from the routing table information packet; and  
6           ninth instructions for unlocking the locked portion of the routing table.

1   21.   The computer program product of claim 19 wherein the fourth instructions for  
2   retrieving forwarding information from a routing table further comprises:  
3           tenth instructions for searching the routing table;  
4           eleventh instructions for determining if a portion of the routing table is locked;  
5           twelfth instructions for waiting for the portion of the routing table to be  
6   unlocked; and  
7           thirteenth instructions for retrieving the forwarding information when the  
8   portion of the routing table is unlocked.

1   22.   The computer program product of claim 19 wherein the communication  
2   system comprises a wavelength division multiplexed (WDM) enabled network, and  
3   wherein the first shared memory stores packets transmitted on a single wavelength on  
4   the WDM-enabled network.